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JP 070091970 A US 5552989 A US 4527155 A

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(54) Abstract Title
Map display device with orientation means.

(57) A map display device comprises means to receive and display a map 102 corresponding to the location of the device and orientation determining means 109 so that the map is displayed with the same orientation as the device. Names and labels are arranged so that they are legible whatever the orientation of the map. The display device is preferably a mobile phone which receives map data via GSM. GPS is preferably used to establish the location of the device. The orientation determining means may be in the form of an electronic compass 109 which determines the direction of magnetic north. Also claimed is a mobile phone with magnetic north determining means enabling this to be displayed on the phone's screen.

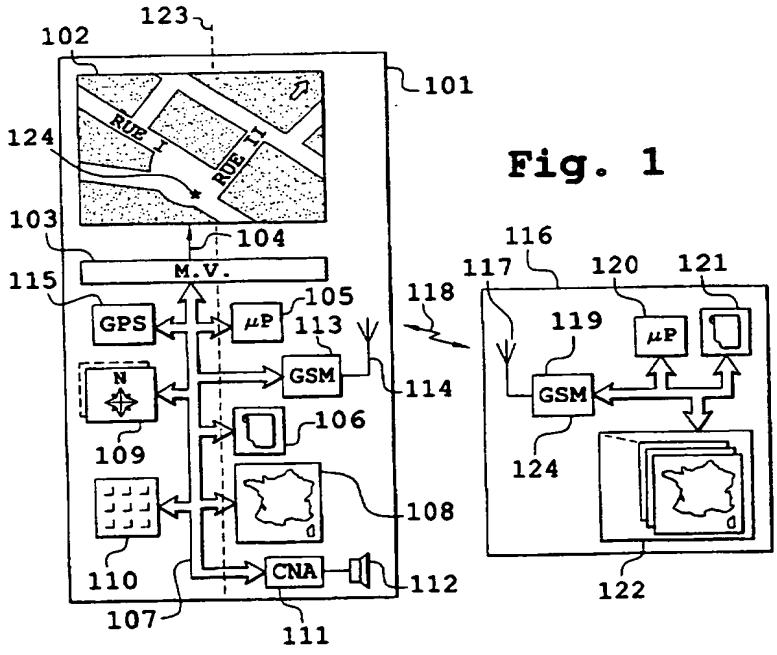

Fig. 1

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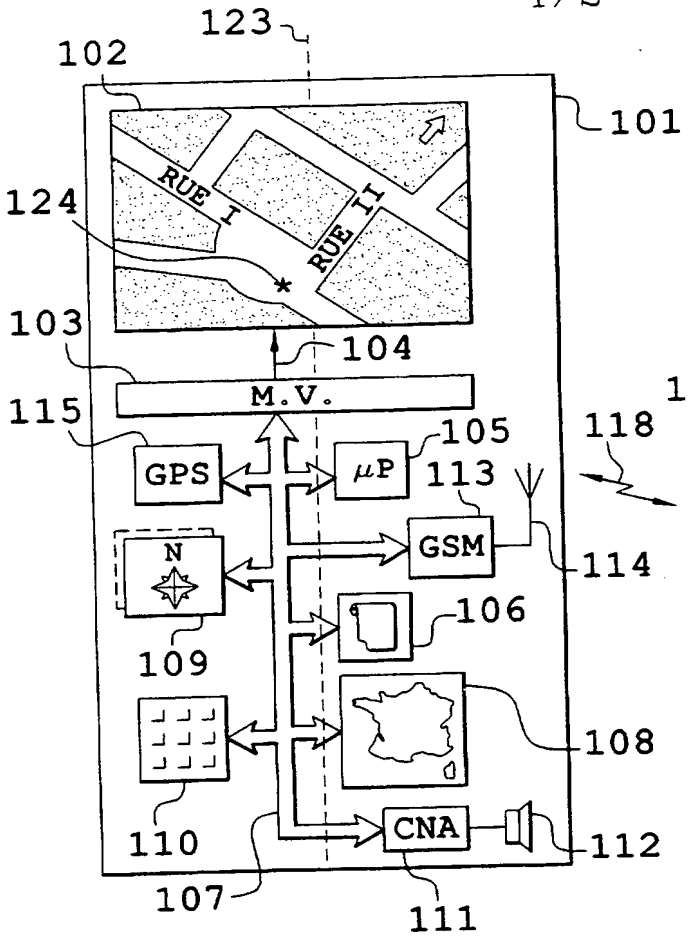


Fig. 1

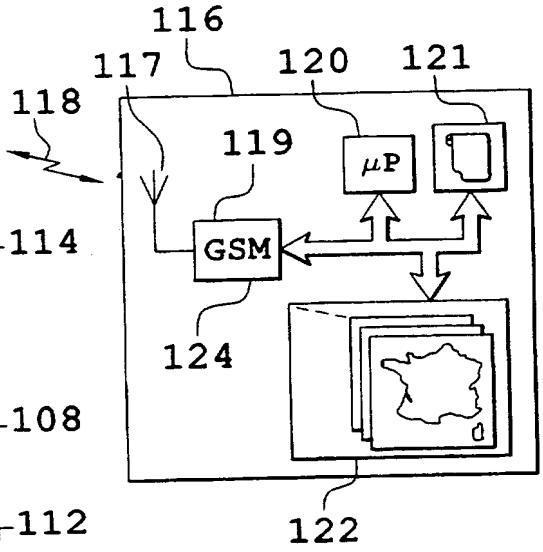


Fig. 3a

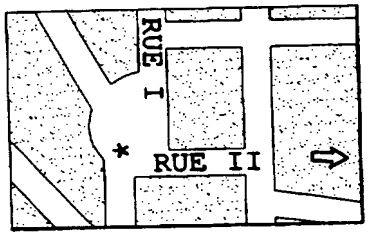


Fig. 3b

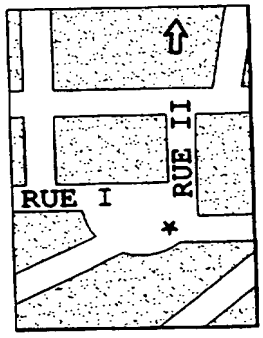


Fig. 4a

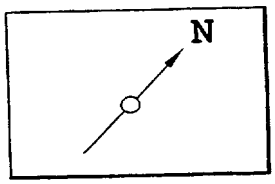


Fig. 4b

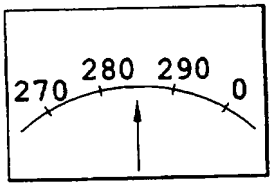


Fig. 4c

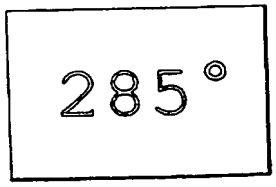
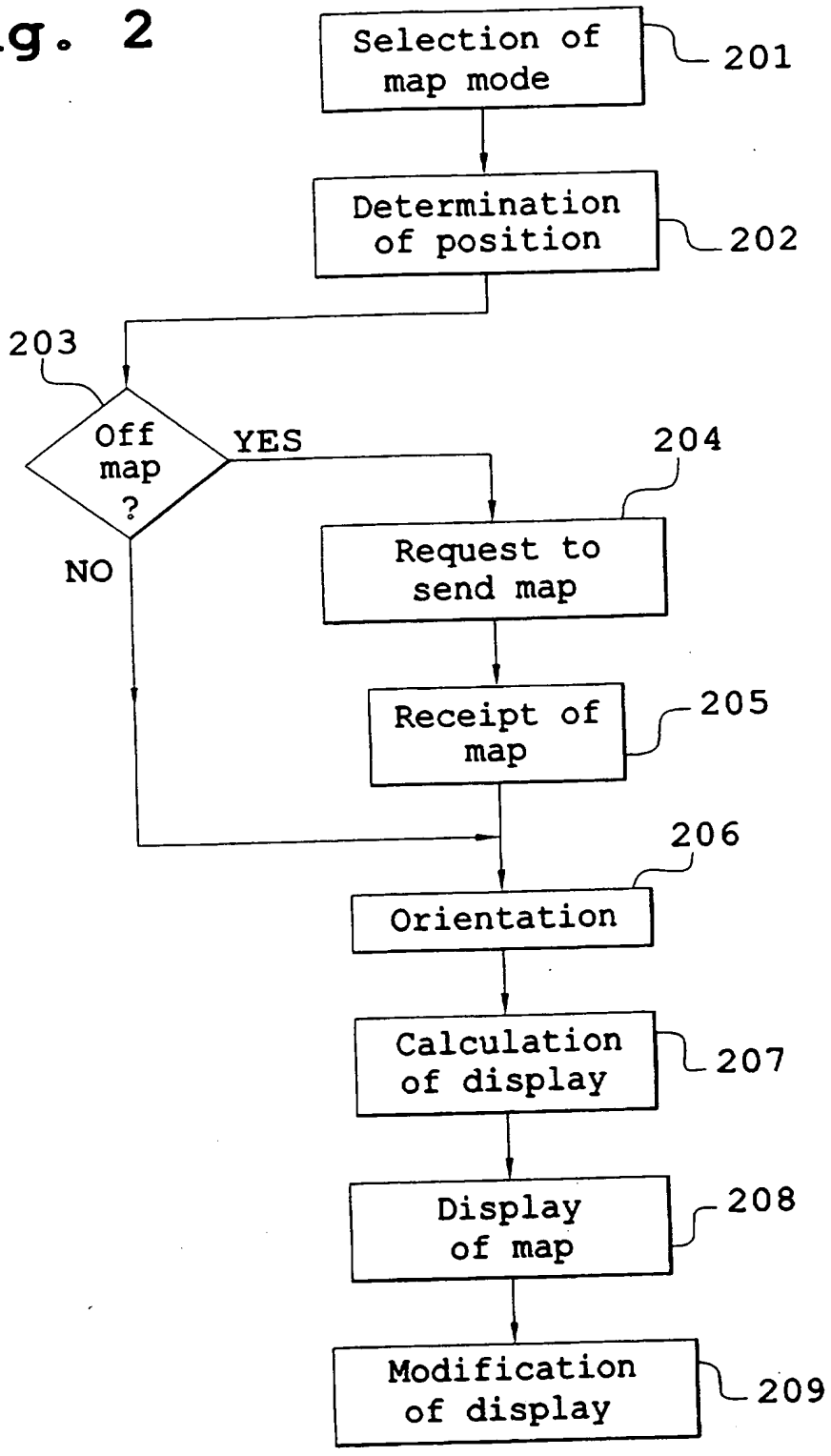


Fig. 2


Selection of map mode
201
Determination of position
202
203
Off map ?
YES
204
NO
Request to send map
Receipt of map
205
206
Orientation
Calculation of display
207
Display of map
208
Modification of display
209

Handheld device consisting of means of orientation and a process for using such a device and corresponding orientation process

The object of the invention is a handheld device consisting of means of orientation and a process for using such a device and corresponding orientation process. The field of the invention is that of handheld electronic terminals, more especially terminals comprising a screen, means of processing and means for entering information. As an example mobile telephones can be cited. The aim of the invention is to provide the electronic terminals in the field of the invention with the possibility of positioning and orientation. Thus a user of the terminal knows his position and can determine the best route to the place where he wishes to go. A further aim of the invention is that its possibilities of orientation and positioning are the most easily accessible by a user of the terminal. In practice the terminal may very well be a laptop computer.

In the state of the art, handheld terminals are known which consist of a screen and a keypad and means of positioning and orientation. However these terminals are dedicated to positioning and orientation. This means that they have in a memory a set of maps which are either set once and for all, or which can be updated or changed but by changing a physical component of the terminal. A user who moves around a lot must therefore have several of these components comprising different maps depending on where he is. Furthermore a handheld terminal such as this shows information on positioning and orientation for people who have use for such a device, for example trampers or navigators. These people are therefore familiar with having a device which shows information on positioning and orientation in a "standard" way. In particular a user who may not be familiar with this presentation may have difficulty in locating himself if a map is not presented in the right direction. In other words, if the bottom of the

map which the user is looking at corresponds to what is in front of him. It would therefore be necessary for him to mentally carry out a rotation of 180° in his head in order to be able to position himself.

Furthermore, terminals such as described in the above paragraphs have a certain bulkiness due to the autonomy that they must have in order to satisfy the requirements of their users. Actually, users of these devices may find themselves isolated for several days and the terminal must not run out of electricity. Knowing that the need to know his position may be frequent, the battery must therefore be suitably sized. The terminal itself is subjected to atmospheric conditions which may be variable and very damp. The whole terminal is sized in terms of these considerations. This does not necessarily correspond to the situation in which must people find themselves. These terminals are therefore inappropriate, due to their bulkiness and their specialization, for day to day use by people with a normal activity. The main problem in this case being that of bulkiness in relation to the terminal's use.

It is also often that when travelling, either professionally or personally, a user has to look for his route. This can occur either in urban or rural areas, and no matter where in the world. The current solution when one knows where one must go is to have the appropriate map. However a paper map is not always easy to use. It has to be unfolded and a good mental representation and memory is needed. Actually, indications on a map are only appropriate to be read if the map is held in one direction. It may not therefore be easy to position oneself. Also, it may be that the place where one is, is on the edge of several maps which means having to juggle between several documents. Maps also have a problem of bulkiness and rapid deterioration if they are used too often or not looked after.

The invention solves these problems by integrating in a currently used electronic device, for example a mobile telephone, means of positioning and orientation. The electronic device in question then becomes multifunctional and can be requested to fulfill its function of positioning and orientation included in the device. To fulfill the latter function, the screen and the keypad of the electronic device are used. On the screen a map is displayed which positions itself, in other words it carries out a rotation in relation to an axis perpendicular to the screen, in terms of the position of the device. This orientation is made possible by the means of orientation included in the device. This orientation is carried out so that the map is orientated in such a way as to be as readable as possible by the user of the devices. This means that the top of the map, displayed on the top of the device's screen, corresponds to the direction in which the user is looking. This also means that the indications carried on the map displayed on the device's screen can be read so that the user does not have to do mental gymnastics, like reading upside down for example.

In the invention the electronic device is equipped with means of positioning, it is therefore able to signal its presence in a place and to request that it be sent the map of that place. This enables avoiding having to store all the maps of all the places where the device's user may be likely to go. Therefore memory storage space is saved. In the same way if the calculations for presentation of the map are too large these can be made remotely in relation to the device.

The object of the invention is therefore an electronic device comprising means of receiving and displaying a geographical map comprising an indication of orientation and corresponding to the place where the device is, characterized in that it comprises means of orientation providing a privileged direction so that the orientation of

the geographical map displayed is turned towards the privileged direction provided.

In addition, the object of the invention is a process for using a device in which:

- a map is displayed on a device's screen,
- the display capabilities of a map are accessed via a device's keypad or via a menu accessible by the keypad, characterized in that
- the position where the device is, is determined,
- a message of request to receive a file containing information is issued enabling the display of a map corresponding to the position where the device is,
- a map file of the place where the device is, is received, this map file comprises orientation information enabling the map to be positioned,
- the position of a privileged direction is determined in relation to where the device is,
- the place where the device is on the map received is determined,
- the display of the map received is changed so as to make a symbol appear on the screen representing the position of the device on the map received.

A further object of the invention is a process of orientation characterized in that from a mobile telephone:

- the position of magnetic north is determined,
- the direction of this magnetic north is displayed on the mobile telephone's screen.

The invention will be better understood by reading the following description and by studying the accompanying figures. These are given by way of example and are in no way limiting to the invention. The figures show:

Figure 1 an illustration of the means necessary for implementation of the invention.

Figure 2 an illustration of steps of processes according to the invention.

Figure 3a an illustration of the presentation of the map in figure 1 according to a second orientation.

Figure 3b an illustration of the presentation of the map in figure 1 according to a third orientation.

Figures 4a, b, c an illustration of the possible modes of presentation of orientation information.

Figure 1 shows an electronic device 101. For our example, the electronic device 101 is considered to be a mobile telephone. This means that right through the description the word telephone could be replaced by the word device. The telephone 101 comprises a screen 102 which enables a map to be displayed. The screen 102 is connected to a video memory 103. The memory 103 contains information corresponding to the image which is displayed on the screen 102. In the example chosen, it is considered that the memory 103 contains an image in bitmap format. In other words a matrix whose lines and columns correspond to the dots displayed on the screen. If it is considered that the screen 102 is a liquid crystal screen without graying and with a resolution L for the width and H for the height then the memory 103 contains at least L*H squares. Each square corresponds to a dot on the screen 102. If the square is a 1 this means that the dot is on, if the square is a 0 it means the dot is off. By on, it is understood to mean that the dot is visible in other words black. There are other systems for representation of an image in a memory. Here the easiest one to describe has been chosen. The element 103 and the screen

102 are connected by a link 104. This link 104 includes, in a manner not represented, the transformation of the contents of the memory 103 into electric signals which the screen 102 can receive.

The video memory 103 is written by a microprocessor 105, controlled by programs contained in a program memory 106. In the telephone 101, the memory 103, the microprocessor 105 and the memory 106 are connected to each other by a bus 107. The bus 107 carries all the signals which are needed for the normal operation of the device 101. Among these signals are control signals, address signals and data signals.

The device 101 also has a memory 108 connected to the bus 107. The memory 108 stores the information concerning the map which is to be displayed on the screen 102. This information contains an image file in any format, in the example we have chosen to use the bitmap format. But this format is not limiting to the invention. A compressed image format can just as well be used, in order to save memory space. This would involve more complicated algorithms for carrying out the rotation on images. In fact, it would first be necessary to decompress the image. The data contained in the memory 108 also comprises information for orientation of the image. If it is considered that the image contained in the element 108 represents a map, this orientation information constitutes for example an indication on where the north is situated in the image. In practice, it may be that the two lots of information, orientation and image file, are stored in different memories. In the example it is considered that the image is a matrix of black and white dots, the upper edge of the matrix corresponding to the north of the image. This choice is arbitrary and other conventions of orientation could have been chosen without affecting the invention.

The telephone 101 also comprises means of orientation 109. The means 109 are connected to the bus 107. This enables the

microprocessor 105, when it calculates how it must display the image on the screen 102 from the contents of the memory 108, to know to what angle it must turn the image contained in the memory 108. Actually when the image is displayed on the screen 102, the geographical north of the image is displayed in the direction of the magnetic north provided by the means 109. In the example the means 109 are therefore sensors of magnetic north. In practice, this is in fact two orthogonal magnetoresistive films or two Hall effect sensors. These films provide varying signals according to a known law in terms of the components of the earth's magnetic field. From these signals delivered by the means 109, the microprocessor 105 is therefore able to determine in which direction the magnetic north is. In order that these means operate correctly, they must be correctly positioned, in other words flat in relation to the earth's surface. Preferably, and so that the device can operate whatever the position of the telephone in other words held upright or flat, two couples of magnetoresistive films are provided. One of these couples is used when the telephone is held flat, the other when it is held upright. The switching between these two couples of magnetoresistive sensors is carried out using a measurement of a plate of the mobile telephone 101.

In practice, it is also necessary to take care that the means 109 are situated sufficiently far away from a loudspeaker, in the case of a mobile telephone. In effect the loudspeaker is an electro-acoustic element which produces a strong magnetic field. A field such as this is liable to disrupt the measurement by means 109. The means 109 will therefore preferably be situated in the telephone 101 on the opposite side to its loudspeaker.

The telephone 101 also has a keypad 110 which is connected to the bus 107. The keypad 110 enables the telephone to be changed to orientation and positioning mode. Once in this

mode, the keypad 110 enables the display of the map on the screen 102 to be scrolled or changed.

The telephone 101 also has an analog numerical convertor 111 connected on one hand to the bus 107 and on the other to a loudspeaker 112. It is thus possible, for example, to acoustically broadcast a sound when the telephone 101 is turned in a predetermined and coded direction. This direction can be the magnetic north. This enables the mobile telephone to be used as a means of orientation without having to look at the telephone 101. The telephone 101 also has a GSM circuit 113 connected on one hand to the bus 107 and on the other to an aerial 114.

In this case the circuit 113 is GSM, but it could also correspond to another standard for mobile telephone or aerial transmission. It is by using the circuit 113, controlled by a program contained in the memory 106 via the microprocessor 105 that the contents of the memory 108 can be updated in terms of the position of the telephone 101. In order to determine its position, the telephone 101 has a GPS circuit 115. The circuit 115 is connected to the bus 107. The circuit 113 enables information to be received as well as to be sent. The aerial 114 of the telephone 101 is connected to a base station or server 116. The station 116 has an aerial 117, thus a radio wave connection 118 between the aerial 114 and the aerial 117 is established. The aerial 117 is connected by a GSM circuit 124. On the other hand the circuit 124 is connected to a bus 119, a bus 119 which on the other hand connects a microprocessor 120, a program memory 121 and a data memory 122 to each other. The program memory 121 contains instruction codes which enable the microprocessor 120 to control the circuits 124 and manage the data memory 122. The data memory 122 contains the files corresponding to the maps likely to be requested at the station 116 by a mobile telephone which is connected to it. In actual fact the base station 116 is fixed. It therefore contains the maps corresponding to the areas which are

within its broadcasting range. However, if it were not to contain a map which could be requested by a telephone 101 which is connected to it, it could obtain this map through the network to which it is connected. In actual fact a station such as the station 116 is not isolated. It is part of a network, such as a mobile telephone network, comprising numerous base stations all connected to each other and to different servers.

In a variation of the invention the map files are recorded on a map server dedicated to this application of positioning and orientation. Thus, when the telephone has to receive a map it sends its request through the network of the operator of the mobile telephone to which its user subscribes. This request is addressed to the map server which is managed either by the operator, or by the service provider. The map server is therefore connected to the mobile telephone's network. Naturally this server can be divided up according to several geographical areas so as not to overload a single station with communications. In other words the server includes several independent sub-servers, autonomous and capable of managing a certain number of mobile telephones. Consequently the network base stations are used only as relays for the information between the map server and the mobile telephone.

Figure 2 shows that the process according to the invention has a preliminary step 201. Step 201 is a step for selecting the orientation and positioning mode. In actual fact, the telephone 101 is not destined just to only do positioning and orientation. It is therefore necessary to select from among its operating modes the one which corresponds to orientation and positioning. This is done by means of the keypad 110. For example one of the keys on the keypad 110 enables going into a menu mode, other keys on the keypad 110 are used to select from this menu going into the orientation and positioning mode. Then one goes to a step 202 for determining the position of the telephone 101.

In step 202, the microprocessor 105 controls the circuits 115. The circuits 115 provide the microprocessor 105 with information concerning its position. This information, is for example, constituted of a latitude, a longitude and an altitude. In our application only the latitude and longitude are of interest. On the other hand as the GPS system is only accurate to a hundred meters, the microprocessor, through the circuit 113 and the aerial 114 enters into contact with the station 116 to which it is connected by the link 118. The microprocessor 105 therefore sends a request for correction of its position to the station 116. This correction request is received by the station 116 which in turn sends a message in the direction of the telephone 101. The telephone then corrects the data delivered by the circuit 115. This correction is carried out for the microprocessor 105 under the control of a program contained in the memory 106. In an example this correction is obtained by the station 116 as it has a GPS circuit, and knows its exact position. It is therefore able to determine what error is made by GPS by indicating its position to it. Consequently the station 116 can calculate the parameters to correct the error made by GPS and transmit these parameters to all the telephones connected to it. In the case one refers to differential GPS. It is to be noted that for the invention it is not the way in which the coordinates are obtained that is important but the fact of having these coordinates. They could in particular be obtained outside the device, for example by the network by measuring the propagation time to several network bases. The result of this measurement would then be transmitted to the telephone.

Once the position is determined, one goes on to a step 203, to know whether, according to the coordinates which have just been calculated, the telephone 101 is still in the map contained in the memory 108. In actual fact, the map contained in the memory 108 has a certain geographic extension. This geographic extension is known. In step 203,

the microprocessor 105, therefore compares the coordinates that it has just obtained from the circuit 115 to the coordinate limits of the map contained in the memory 108. If the mobile telephone is still in a place represented by the map contained in the memory 108, one goes on to an orientation step 206. Otherwise one goes to a step 204 asking for a map to be sent. In step 204, the microprocessor 105 composes a message which is going to be sent in the direction of the station 116. This message contains information relating to the positioning, spatial coordinates for example, the telephone 101 and to the fact that it wishes to receive a map corresponding to its position. Once this message is composed it is transmitted to the circuit 113 which then transforms it into radio wave signals which will be transmitted via the aerial 114. These signals are received by the aerial 117 which transmits them to the circuit 118. The circuit 118 demodulates them so as to make them available to the microprocessor 120. The microprocessor 120 detects that this is a request for sending a map. The microprocessor 120 takes into account the coordinates that it has just received to search in the memory 122 for the map which corresponds to these coordinates. Once it has found this map, it broadcasts it in the direction of the telephone 101. One then goes on to step 205 for receiving the map.

In step 205, the telephone 101 receives via the aerial 114 and the circuit 113 the data corresponding to the map that it requested. This data is received by the microprocessor 105 which stores it in the memory 108. The memory 108 can contain information relating to a plan which is larger than that displayed on the screen 102. If the contents of the memory 108 are in bitmap format, the transmission is not necessarily carried out in this format. In actual fact, for transmission a compressed form of information can be used, this enables the transmission to be carried out in less time. In particular in the case of a mobile telephone, the fax functionalities of this mobile phone which have already been provided can be used. A fax image is in fact a bitmap

compressed then transmitted. The telephone 101 can therefore receive an image in fax format, then decompress it, then write the result of the decompression into the memory 108. The reception and decompression are of course controlled by the microprocessor 105. One then goes on to step 206 for orientation.

In step 206, the microprocessor 105 interrogates the means 109 in order to know in which direction the telephone 101 is turned. The orientation of the telephone 101 is determined by the axis which goes from the top to the bottom of the telephone. If the telephone is held flat, in other words the back of it is parallel to the ground. Or the direction of the telephone is determined by a straight line perpendicular to the screen when the telephone is held upright. Initially only the case where the telephone is held flat will be dealt with. When the telephone is flat, it is therefore considered that it is positioned in the direction bottom to top. The means 109 enables the direction of north to be determined in relation to the orientation of the telephone. Thus the rotation which must be applied to the map contained in the memory 108 is determined before displaying it on the screen 102. In actual fact, the angle between the orientation of the telephone and the direction provided by the means 109, is the angle by which the map must be turned. The aim of this rotation is that the geographic north of the map contained in the memory 108, corresponds to the magnetic north provided by the means 109. It is considered that the angle between the orientation of the telephone and the direction provided by the means 109 is an adjusted angle. This angle enables the determination of the coefficients of a matrix of change of base. This matrix of change of base enables going from the map 108 to the map which will be written by the microprocessor in the memory 103 the contents of which are displayed on the screen 102. The matrix of change of base is a matrix of 2*2. In actual fact the map contained in the memory 108 can be considered as a two dimensional space. This space is then given an orthonormal

reference in which each of the map points has coordinates. To determine what the coordinates of these points will be after the rotation, all that is needed is to multiply the coordinates prior to the rotation by the matrix of change of base.

The method described here for carrying out the rotation of the map contained in the memory 108 is a simple method which applies itself well to the example's storage mode. In practice there are other storage modes and other rotation modes which are quicker. These methods are known, as well as the algorithms which implement them.

One goes on to step 207 for calculation of the display. In this step the microprocessor 105 determines which part of the map contained in the memory 108 is the part of interest in terms of the position of the telephone 101. Once it has determined the relevant part of the map, it carries out a rotation on this part of the map then it writes the results of this rotation into the memory 103. In step, 205, at the same time as information concerning the map, the telephone 101 has received information concerning the places represented on this map. This information is names. Each name is associated with coordinates. Thus it is known where to display which name. In a step 207, the microprocessor 105 determines which are the names that it is appropriate to display in terms of the part of the map which is displayed on the screen 102. Then it carries out a processing of these names so that they are displayed in such a way that they can be read by the user of the telephone 101 without him having to change his angle of observation of the screen 102, or having to perform mental gymnastics in order to be able to read the names.

Figure 3b shows a part of the contents of the memory 108. This is a street map. The north is positioned towards the top of the map according to the storage conventions chosen. The telephone 101 is itself positioned in north-west

direction. The microprocessor must therefore carry out a rotation on the map in figure 3b in order to obtain the map shown on the screen 102. On the map of the screen 102, the north makes an angle of 45 degrees with the direction of telephone 101. The direction of the telephone 101 is materialized by the axis 123. Figure 3a shows what the display of the screen 102 would be if the telephone 123 was oriented in a West direction. In this case the North would be situated on the right of the telephone 101. Whatever the display which is considered, be it on figure 1, figure 3a or figure 3b, the name of the places is always legible without it being necessary to change the angle of observation of the image.

In a step 207, the microprocessor 105 also calculates the place where it is going to display the symbol corresponding to the position of the telephone 101 on the map. In our example, this symbol is a star 124. One then goes on to a step 208 for displaying the map. In practice step 208 is carried out continuously. The results of the calculation of the display by the microprocessor 105 are written into the memory 103. The memory 103 is continuously scrutinized in order to refresh the contents of the screen 102. One goes on to a step 209 for changing the display. In this step the user of the telephone 101 can make use of the keypad 110 to change the display of the screen 102. In actual fact, it is not necessarily of interest that the symbol representing the position of the user of the screen 102 is situated in the middle of the screen. In actual fact, the user may wish to have a larger vision of the part of the map which is in front of him. So the user uses the keys of the keypad 110 to move the symbol 124 on the screen. This movement is accompanied by a scrolling of the map. This returns to selecting a new area of interest in the memory 108. It is then necessary to recalculate the rotation of the new area of interest then update the memory 103.

The keys of the keypad 110 are also used to change the scale of the display of the map on the screen 102. This enables having a detailed view or of all of the place where one is.

In a variation of the invention the user of the telephone 101 provides coordinates to the telephone 101. These coordinates are transmitted to the base station 116. In return, the station sends a map centered on the coordinates transmitted. The user then uses the keypad 110 to display and scroll through the map received on the screen 102.

Each time that the orientation of the telephone changes, the display of the screen 102, in other words the contents of the memory 103, is recalculated. The area of interest of the memory 108 does not necessarily change but the rotation that must be applied to it changes. Therefore a new calculation of rotation must be carried out. Likewise when the user moves, the position of the telephone 101 changes. The area of the memory 108 which is of interest for the display 102 therefore changes. Therefore a new calculation must be carried out in terms of the new area of interest. So as not to overload the telephone 101 with calculations, it may be decided to carry out the update of the display in terms of the change of position or of orientation only with a certain frequency. In so far as the speed of movements of the user of the telephone 101 are not great, this spacing between the updates of the display of the screen 102 is not harmful.

If however it is desired to totally avoid overloading the telephone with calculations, these can be carried by the station 116. This actually has the position of the telephone and the telephone 101 can also transmit its orientation to it. From then onwards the station 116 is able to calculate the map which is to be displayed on the screen 102. Once this calculation is done the station 116 can transmit the map resulting from the calculation to the telephone 101. The microprocessor 105 therefore receives it and writes it directly into the memory 103 without going through the

memory 108. In this case the telephone 101 is not overloaded with calculations, but the number of communications between the telephone 101 and the station 116 increases.

It may be during a movement of the user that he goes out of the geographic area described by the map contained in the memory 108. In this case the telephone 101 establishes a connection with the station 116 in order to receive a map corresponding to its new position. This concerns steps 202, 204 and 205. If this transmission takes some time, a message is displayed on the screen 102 to warn the user of the temporary unavailability of the telephone 101 in positioning or orientation mode.

For the case where the mobile telephone is held upright, the previous description is still valid since it is only that the orientation information comes from a different source. In actual fact this is the second pair of magnetoresistive sensors.

The user of the telephone 101 may also only require orientation information. In this case, the screen displays either an arrow indicating the direction of North, figure 4a, or an arc of a circle graduated in degrees, with an arrow indicating the center of the arc of the circle and the graduation indicating the direction in which the mobile telephone is turned, figure 4b, or the heading in which the mobile telephone is turned, figure 4c, is indicated.

Likewise it may be sufficient to display latitude and longitude information by the circuit 115. This information is provided by the circuits 115.

CLAIMS

1. An electronic device, comprising means to receive and display a geographical map with an indication of orientation, and corresponding to the place where the device is, wherein the device comprises means of orientation providing a privileged direction, so that the orientation of the geographical map displayed is positioned towards the privileged direction provided, and said device also comprises means of displaying names so that they are legible without the need to change an observation angle of the device.

2. A device according to claim 1, wherein the indication of orientation is a geographical North.

3. A device according to claim 1, wherein the privileged direction is magnetic North.

4. A device according to any one of claims 1 to 3, wherein the device is a handheld device.

5. A device according to any one of claims 1 to 4, wherein it comprises means of broadcasting message-containing information.

6. A device according to any one of claims 1 to 5, wherein the device is a mobile telephone.

7. A device according to claim 6, wherein the mobile telephone is one using the GSM standard.

8. A device according to any one of claims 1 to 7, wherein the means of orientation are sensors whose signals provide the enabling of the deduction of a magnetic north used as the privileged direction.

9. A device according to claim 8, wherein the sensors comprise two orthogonal magneto-resistive films.

10. A device according to any one of claims 1 to 9, wherein it comprises means of positioning.

11. A device according to claim 10, wherein the means of positioning is a GPS system.

12. A device according to any one of the preceding claims, wherein it comprises means of orientation for changing the display mode when it is placed horizontally or vertically.

13. A device according to any one of the preceding claims, wherein it comprises means for producing sound.

14. A process for using a device in which:

- a map is displayed on the device's screen,
- the functionality of a display of a map is accessed via a device's keyboard, or via a menu accessible from the keyboard,

wherein,

- the position is determined where the device is,
- a request message is transmitted to receive a file containing information enabling the display of a map corresponding to the position at which the device is,
- a map file is received of the place where the device is, this map file having orientation information enabling the map to be positioned,
- a privileged direction is determined in relation to the device,
- the place where the device is on the map received is determined,
- the display of the map received is modified so that a symbol appears on the screen representing the device's position on the map received,
- a name is displayed so that the name(s) are legible without needing to change the observation angle of the device.

15. A process according to claim 14, wherein the place on the screen is selected where the symbol representing the device's position is displayed.

16. A process according to claim 14, or claim 15, wherein the display of the map received is changed in terms of the movements of the device.

17. A process according to any one of claims 14 to 16, wherein the file comprises information relating to the names of places, and these names are displayed so that they are legible by a user of the device, without this user having to read backwards or change his angle of observation of the device.

18. A process according to any one of claims 14 to 17, wherein the scale at which the map is displayed is increased or reduced.

19. A process of orientation, wherein, from a mobile phone:

- it is determined where magnetic north is, and
- the direction of this magnetic north is displayed on a mobile telephone's screen.

20. A process according to claim 19, wherein, a compass portion is displayed, and on this compass portion the heading towards which the device is turned is displayed.

21. A process according to claim 19, wherein the heading towards which the device is turned is displayed.

22. A process according to any one of claims 18 to 21, wherein an acoustic signal is emitted when the device is turned towards magnetic north.

23. A process according to one of claims 14 to 18, wherein calculations are carried out, corresponding to the orientation of the map and the display of names on this

map, by a server radio-electrically connected to the device.

24. A process according to one of claims 19 to 21, wherein calculations are carried out, corresponding to the orientation of a map and the display of names on this map, by a server radio-electrically connected to the mobile phone.

25. An electronic device adapted to receive and display a map with an indication of orientation and its location, substantially as hereinbefore described with reference to the accompanying drawings.

26. A process for operating an electronic device having a display screen capable of displaying a map on the screen, and the functionality thereof is accessed by an input device, substantially as hereinbefore described with reference to the accompanying drawings.

27. A process of orientation by use of a mobile telephone, substantially as hereinbefore described with reference to the accompanying drawings.

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Claims searched: 1 to 18, 22, 23, 25 & 26. **Date of search:** 17 May 2001

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Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.S): None.

Int Cl (Ed.7): None.

Other: Online: EPODOC, PAJ, WPI.

Documents considered to be relevant:

Category	Identity of document and relevant passage		Relevant to claims
A	EP 0816803 A1	(SAGEM SA) See whole document.	1 & 7.
X	EP 0505152 A1	(PIONEER ELECTRONIC CORP.) See whole document.	1 to 3, 8, 10, 11 & 13 to 18.
X	US 5552989 A	(BERTRAND) See whole document.	1 to 4, 8, 10, 11 & 13 to 18.
X	US 4527155 A	(YAMAKI ET AL.) See whole document.	1 to 3, 8, 10, 11 & 13 to 18.
A	DE 19514133 A1	(WEHDE) See whole document.	1 & 7.
X	JP 07 091970 A	(MATSUSHITA) See whole document.	1 to 4, 8, 10, 11 & 13 to 18.

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